tween their volumes remaining constant between 17° C. and 20° C. As regards the respiratory function, then, the mosses come into the general case of chlorophyll-containing plants. In the closed condition, the activity of the chlorophyll function (assimilation) diminishes nearly 50 per cent. The activity of both respiration and chlorophylline assimilation abates as the moss becomes dry. The inference may be made that these functions slacken during the summer with the mosses. It is in spring and autumn, when they are continually moist, that they elaborate nutritive materials most actively. This explains the appearance of the sporogonia during these seasons in so large a number of species.—RODNEY H. TRUE.

Anatomy of the stolons of Gramineæ.[1]

Although the function of the stolons in the Gramineæ is nearly the same, being at once reservoirs of nutritive matters and organs in the service of the vegetative propagation, the author has observed several differences in the interior structure. And he claims at the same time, that the two general types of stolons, which have been proposed by another author, Mr. Johanson,[2] are not sufficient, when the question is to characterize the structure of these organs in general. The two types mentioned by Mr. Johanson were distinguished by the different arrangement of the mechanical tissue, which is either central with a large cortex in contrast to a reduced pith, or nearly subepidermal with a large pith and a reduced cortex. But the author enumerates now several other anatomical features, observed in stolons of different genera, which occur under different conditions. He shows from the numerous intergradations between the stolons under-ground and the shoots above-ground, that the organization of the stolon depends upon a modification of the above-ground shoot. The structure of the shoot above-ground is well marked by the position of the mechanical tissue, which is either truly subepidermal or more or less distinctly subcortical, the bark being as a rule not very strongly developed. But there is a large series of modifications between this form and those derived from such shoots as show a tendency to replace stolons.

[1] P. HELLSTRŒM: Naagra iakttagelser angaaende anatomien hos græsens underjordiska utlöpare. Bihang Kgl. Sv. Vetensk. Akad. Hdlgr. vol. XVI, no. 3. Stockholm, 1891.

[2] Kgl. Sv. Vetensk. Akad. Hdlgr. vol. XXIII, no. 2, p. 30.

There is also given an account of the structure of the scale-like leaves, which cover the stems under-ground. These consist of a strongly mechanical tissue, which encloses the mestome-bundles, which here often contain a mere leptome. This, as it seems, peculiar fact is, however, easily explained, since the function of such leaves is not assimilatory; they do not need, therefore, the elements of the hadrome, but merely the leptome, for the supply of already prepared organic matters. The function of the strongly developed stereome in these leaves is not only to protect the leptome, but also to form a kind of support to the entire stolon.

As regards the endodermis, the author states several variations in the stolons, which he has examined, and which he refers to two groups: the so-called O-endodermis, the cells of which are thickened equally all around, while in the second one, the C-endodermis, it is merely the inner and the radial walls in which a thickening has taken place. A double endodermis was observed in some species of Triticum, Calamagrostis and others. (The writer takes here the opportunity to call attention to similar studies upon our native grasses, in which the vegetative propagation is so strongly predominant, and which might give still more extended illustration of the characters enumerated above.)—THEO. HOLM.

Studies upon germination.[1]

In a recent paper[1], Hildebrand describes the germinating plantlet of *Cecropia peltata* upon which he has observed a long series of different forms of leaves, from ovate to cordate, gradually succeeded by peltately three or five-lobed leaves until finally the typical form appears in the nine-lobed leaf. He shows also the gradual development of the "domatia" at the base of the petioles, in which the protecting ants take up their residence and feed upon a certain kind of exudation. These domatia are not present, however, at the very earliest stage of the plantlet, and the plant is therefore forced to provide another kind of protection against the climbing, leaf-eating ants. This is done by short branches developing from the lower leaves, having merely two sessile stipules, which are bent downwards and thereby prevent the animals from climbing the stem. It is only when about the twentieth leaf is de-

[1]Fr. Hildebrand: Einige Beobachtungen an Keimlingen und Stecklingen. Botan. Zeitung, 1892, Nos. 1, 2 and 3.